Kathryn Mann

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Appointments

Associate Professor of Mathematics, Cornell University 2022–
Assistant Professor of Mathematics, Cornell University 2019-22
Manning Assistant Professor of Mathematics, (tenure-track) Brown University 2017-2019
Morrey Visiting Assistant Professor / NSF postdoctoral researcher, UC Berkeley 2014-2017
Postdoctoral research fellow, Mathematical Sciences Research Institute. Spring 2015
Visiting position Professeur Invité, Inst. Math. Jussieu (Paris VI) May-June 2016

Education

Ph.D. Mathematics, University of Chicago Advisor: Benson Farb 2014
B.Sc. Mathematics and Philosophy, University of Toronto 2008

Grants and Recognition

Joyce Yelencsics & Frederick Rosevear Faculty Leadership Fellow, Cornell named fellowship 2022-27
Cornell Topology Festival, co-PI on NSF conference grant, $72k 2023-25
Mathematics department teaching award, Cornell university 2021
NSF CAREER award, DMS 1844516 $476,502 2019-2024
Sloan Research Fellowship, Alfred P. Sloan Foundation $70k 2019-2023
Kamil Duszenko Award Wroclaw Mathematicians Foundation 2019
AWM Birman Research Prize in Topology and Geometry Association for Women in Mathematics 2019
Mary Ellen Rudin young researcher award (annual Elsevier-sponsored award in topology) 2017
NSF Mathematical Sciences Postdoctoral Research Fellowship DMS 1606254 2016–19
Distinguished teaching award, UC Berkeley mathematics 2016
Kowalsky Fellowship for Research Excellence, University of Chicago 2013
NSERC Postgraduate Scholarship (Canadian science and engineering foundation) 2008–10; 2011–13
McCormick Fellowship, University of Chicago mathematics 2008–2010
Norman Stuart Robertson Scholarship in Mathematics, University of Toronto. 2007–08

Publications and preprints

Orbit equivalences of pseudo-Anosov flows.
With Thomas Barthelmé and Steven Frankel. arXiv:2211.10505, submitted

Stability of hyperbolic groups acting on their boundaries.
With Jason Manning and Teddy Weisman. arXiv:2206.14914, submitted

On the action of the (2,3,7)-homology sphere group on its space of left-orders.
With Michele Triestino. arXiv:2204.03058, submitted

Two results on end spaces of infinite type surfaces.
With Kasra Rafi. arXiv:2201.07690, to appear in Michigan Math J.

Groups acting at infinity.
To appear in proceedings of the International Congress of Mathematicians, 2022.

Stability for hyperbolic groups acting on boundary spheres.
With Jason Manning. arXiv:2104.01269, submitted.

Rotation sets and actions on curves.
With Jonathan Bowden, Sebastian Hensel, Emmanuel Militon, and Richard Webb.
Advances in Mathematics 408, Part B, October 2022.

Orbit equivalences of R-covered Anosov flows and applications.
With Thomas Barthelme. arXiv:2012.11811, to appear in Geometry and Topology.

The structure of homeomorphism and diffeomorphism groups.
Notices of the American Mathematical Society, vol 68 no. 4, (April 2021) 482–492.

On the bordism group for actions on the torus.
With Sam Nariman. Annales de l'Institut Fourier, Volume 72 (2022) no. 3, pp. 989-1009.

There are no exotic actions of diffeomorphism groups on 1-manifolds.
With Lei Chen. arXiv:2003.07452. To appear in Groups Geometry and Dynamics.

Large scale geometry of big mapping class groups.
With Kasra Rafi. To appear in Geometry and Topology.

C^0 stability of boundary actions and inequivalent Anosov flows.
With Jonathan Bowden. Annales Scientifique de l'ENS. 4e série, t. 55, 2022. p.1003–1046

Automatic continuity for homeomorphism groups of some noncompact manifolds..
arXiv:2003.01173, to appear in Michigan Math J.

Reconstructing maps out of groups.
With Maxime Wolff. To appear in Annales Scientifiques de l'ENS.

Dynamical and topological obstructions to extending group actions.
With Sam Nariman. Mathematische Annalen, 377.3 (2020), 1313-1338.

Structure theorems for actions of homeomorphism groups.
With Lei Chen. arXiv:1902.05117. To appear in Duke Math. J.

Rigidity of mapping class group actions on S^1.
With Maxime Wolff. Geometry & Topology, 3.24 (2020), 1211-1223.

Realization problems for diffeomorphism groups.
With Bena Tshishiku. *Breadth in Contemporary Topology* AMS Proceedings of Symposia in Pure Mathematics 102, 2019.

A characterization of Fuchsian actions by topological rigidity.
With Maxime Wolff. Pacific Journal of Math 302.1 (2019), 181-200.

Rigidity and geometricity for surface group actions on the circle.
With Maxime Wolff. arXiv:1710.04902 [math.GT], submitted

Unboundedness of some higher Euler classes.
Algebr. Geom. Topol. Volume 20, Number 3 (2020), 1221-1234.

Ping-pong configurations and circular orders on free groups.
With Dominique Malicet, Cristobal Rivas, and Michele Triestino. Groups, Geometry, Dynamics 13.4 (2019), 1195-1218.

On the number of circular orders on a group.
With Adam Clay and Cristobal Rivas. Journal of Algebra 504 (2018), 336-363.

Strong distortion in transformation groups.
With Frédéric Le Roux Bulletin of the London Math. Soc. 50.1 (2018),46-62.

The large-scale geometry of homeomorphism groups.
With Christian Rosendal. Ergodic theory and Dynamical Systems 38.7 (2018), 2748-2779.

Group orderings, dynamics, and rigidity.
With Cristobal Rivas. Annales de l'Institut Fourier, 68.4 (2018), 1399-1445.

PL(M) has no Polish group topology.
Fundamenta Mathematicae 238 (2017), 285-296.

Automatic continuity for homeomorphism groups.
Geometry & Topology 20-5 (2016), 3033-3056. With an appendix with F. Le Roux.

Rigidity and flexibility of groups acting on the circle.
In *Handbook of Group Actions*, Advanced Lectures in Mathematics Vol. 41. International press, 2018

A short proof that Diff(M) is perfect.
New York J. Math 22 (2016), 49-55.

Components of spaces of surface group representations.
Inventiones Mathematicae. 201, no. 2 (2015), 669-710.

Left-orderable groups that don't act on the line.
Mathematische Zeitschrift 280, no. 3 (2015), 905-918.

Homomorphisms between diffeomorphism groups.
Ergodic Theory and Dynamical Systems 35-01 (2015), 192-214.

A counterexample to the simple loop conjecture for PSL(2,R).
Pacific Journal of Math 269-2 (2014), 425-432.

Diffeomorphism groups of balls and spheres.
New York J. Math. 19 (2013) 583-596.

Bounded orbits and global fixed points for groups acting on the plane.
Algebraic & Geometric Topology 12 (2012) 421-433.

Recent invited conference talks and named lectures

Groups and dynamics in geometry conference for U. Hamenstadt (Ascona, Switzerland)	June 2023
Workshop on the Geometry and Dynamics of Groups of Transformations (Fields institute, Toronto)	Jan 2023
Joint Math Meetings (invited special session talk, Boston MA)	Jan 2023
Pacific Rim International Mathematical Association Congress (plenary lecture)	Dec. 2022
ICM 2022 (Invited sectional address)	July 2022
Hyperbolic groups and their generalisations (Inst. Henri Poincaré, Paris)	June 2022
Geometry, Groups and Dynamics conference in honor of Francois Labourie (Corsica)	June 2022
Mapping class groups and Out(Fn) (Inst. Henri Poincaré, Paris)	April 2022
Texas geometry and topology conference (UT Dallas)	Feb 2022
Congreso Latinoamericano de Matematicos (special session talk)	Sept. 2021
Canadian mathematical society 75th anniversary meeting (special session talk)	June 2021
AWM Distinguished Colloquium (University of Maryland)	April 2021
AMS southeastern sectional meeting (online)	March 2021
Kitao mathematics lecture (Swarthmore College)	November 2020
GROW mathematics conference, plenary talk (University of Chicago)	October 2020
Scheduled talks at: Cornell Topology Festival, CIRM, and VI Congresso latinamericano de math. (Summer 2020, cancelled)	
AMS sectional meeting (Binghamton, NY)	October 2019
Aspects of Geometric Group Theory (IHES)	July 2019
Plenary talk at Dubrovnik IX conference on topology and dynamical systems (Dubrovnik)	June 2019
Keynote speaker at 44th Annual New York Regional Graduate Mathematics Conference (Syracuse)	March 2019

Workshop on geometry, groups and dynamics (SungKyunKwan University, Korea)	Dec. 2018
Fields medal symposium (Fields institute, Toronto)	Nov. 2018
AMS Invited Address, Fall Southeastern Sectional Meeting	Nov. 2018
Dynamics, Foliations, and Geometry in Dimension 3 (Matrix Centre, Melbourne, Australia)	Sept. 2018
Workshop on Groups, Geometry and Dynamics (Montevideo)	July 2018
Keynote speaker at graduate student conference in geometry, algebra and topology (Temple university)	June 2018
Boston graduate topology seminar (Boston College)	April 2018
First Canadian geometry and topology seminar (Fields Inst., Toronto)	March 2018
New Methods for Zimmer's Conjecture (IPAM)	Jan. 2018

Recent invited seminar talks

2023: Yale University geometry seminar and Colloquium, Courant Topology and geometric analysis seminar, Inst. Fourier (Grenoble) topology seminar.

2022: PATCH seminar atTemple university, Regensburg university SFB lecture (colloquium), Univ. Bourgogne geometry seminar, IHES geometry and discrete groups seminar, Inst. Math Jussieu colloquium, Ithaca College math colloquium, Columbia university topology seminar.

2021: University of Toronto (colloquium), University of Michigan, UC Berkeley topology seminar, Rice University (colloquium), Maryland dynamics seminar, UW Milwaukee (colloquium), Einstein Institute, Hebrew university (colloquium), Zurich Colloquium in Mathematics, Pangolin online seminar in groups geometry and dynamics, Cornell Math colloquium (Oliver club).

2020: Caltech geometry and topology seminar, Boston College dynamics seminar, Harvard colloquium, Penn State University dynamics seminar, Resistencia Dynamica dynamics seminar (IMPA/Brazil), Geometry and Topology Online (Warwick), Regensburg low-dimensional geometry and topology seminar, Binghamton topology seminar, "Big surfaces" online seminar, McGill geometric group theory, Columbia topology seminar, Virtual seminar in geometry and topology (KAIST / KIAS), Inst. Math. Jussieu dynamics seminar (Paris).

2019: Caltech geometry seminar, UIC math colloquium, Wash U. St. Louis geometry/topology seminar and colloquium, University of Chicago geometry/topology, Queens U. colloquium and topology seminar

2018: Tufts geometric group theory seminar, University of Toronto, Harvard "Open Neighborhood" seminar, Boston graduate topology seminar, University of Virginia geometry seminar and colloquium, University of Chicago dynamics, Monash University math colloquium, Cornell (x2), University of Michigan (x3), Columbia University

Invited minicourses and lecture series

Big mapping class groups Minicourse with C. Horbez at "Curves, surfaces, 3-manifolds" conference (Haifa)	May 2023
Classifying pseudo-Anosov flows on 3-manifolds Minicourse at Beyond Uniform Hyperbolicity (Bedlewo)	May 2023
Anosov flows in 3 dimensions and Anosov-like actions Minicourse w/ T. Barthelme (Anosov dynamics, CIRM)	April 2023
Structure of homeomorphism groups. Minicourse at "Huge groups" Conference (CRM Montreal)	April 2023
Anosov flows, bifoliated planes, and ideal circles. Minicourse (Simons center for geometry and physics)	March 2022
Group actions in low dimensions. Invited lecture series. (KAIST, Korea)	Dec. 2018
1-dimensional dynamics. Undergraduate minicourse at Mathematical Summer in Paris (ENS, Paris)	July 2018
Flat bundles, foliations, and group actions on manifolds. Young Topologists Meeting (Copenhagen)	July 2018
Groups, geometry, and rigidity. 3-week minicourse for graduate students (MIT)	March 2017
Groups of circle homeomorphisms. Beyond Uniform Hyperbolicity 2015 (Olmue, Chile)	September 2015
Algebraic structure of diffeomorphism groups. (Berkeley RTG grad student summer school)	June 2015

Teaching

Cornell University

Math 6320, Riemannian geometry (graduate course)	Fall 2023
Math 4310, Linear algebra (with active learning components, in cooperation with ALI team)	Fall 2022
Math 4520, Classical geometries and modern applications (+ development of active learning materials)	Fall 2021
Math 7520 Berstein Seminar in Topology, graduate topics course on Anosov flows	Fall 2021
Math 2220, Multivariable calculus, two sections	Spring 2021
Math 3210, Manifolds and differential forms	Fall 2020
Math 7520 Berstein Seminar in Topology, graduate topics course on Mostow rigidity	Spring 2020
Math 4530, Introduction to topology	Fall 2019

Brown University

Math 2720, Introduction to dynamical systems (graduate)	Spring 2019
Math 1230, Graph theory (undergraduate)	Spring 2018, Spring 2019

UC Berkeley

Math 141, Differential topology	2016
Math 113, Abstract algebra	2015, 2014
Math 130, The classical geometries	2015

University of Chicago

Math 161–2–3, *Inquiry Based Learning* honors calculus	2013-2014
Math 196, Linear algebra	2013
Math 195, Mathematical methods for the social sciences: Multivariable calculus	2012
Math 113, Introduction to groups and geometry for liberal arts students	2012
Math 112, Elementary number theory for liberal arts students	2011
Math 131–2–3, Single variable calculus	2010-2011
Teaching assistant for: Honors Calculus (Chicago) and Calculus, Symbolic Logic, Intro Philosophy (Toronto)	2007-09

Student supervision

At Cornell:

Supervision of PhD students: Mauro Carmago and Hazel Brenner (current), Benjamin Thompson (summer 2021).

Current member of special committee for: Aria Beaupre, Colby Kelln, Sumun Iyer, Olu Olorode, Nikhil Sahoo, Chaitanya Tappu, Benjamin Thompson.

Co-supervisor of graduate student reading group on mapping class groups and geodesic currents	Spring 2021
Co-supervisor of graduate student reading group on mapping class groups of infinite type surfaces	Fall 2019

Previously:

Undergraduate honors thesis of Taro Shima, Brown University	2019
Supervisor of RISD collaborative study project on projective geometry for architecture/engineering students wintersession	2018
Undergraduate summer research project on Orderable Groups and Topology, Brown university	2018
Undergraduate honors thesis of Sophia Elia, UC Berkeley.	2016

Service

I. Programs

DRP Network. Co-developer, and current lead of oversight team for a national network of *directed reading* (grad–undergrad mathematics mentorship) programs, providing resources and tools for program startup and best-practices and NSF–funded study of efficacy and outcomes. `https://sites.google.com/view/drp-network/`

II. Conferences and seminars co-organized

Communicating mathematics (NSF funded conference at Cornell university)	August 2022
Cornell topology festival (main organizer for virtual conference)	May 2021
Ordered groups and rigidity in dynamics and topology (BIRS workshop)	June 2019
Special session on groups in low-dimensional topology and dynamics (AMS sectional meeting)	Nov 3-4, 2018
Directed Reading Program Workshop (MIT)	May 26-27, 2018
UC Berkeley Topology Seminar	2014-17
Foliations seminar (Joint Stanford-Berkeley seminar/reading group)	Spring 2016
RTG Graduate Student Summer School in topology (UC Berkeley)	July 8-12, 2015
Groups, Geometry and 3-manifolds, conference in honor of Daryl Cooper (UC Berkeley)	May 21-22, 2015
Cohomology of diffeomorphism groups (Joint Stanford-Berkeley research seminar)	2014-15
Special session on geometry of real projective structures (AMS Joint Meetings)	January 4-7, 2012

Scientific or organizing committee for:
MSRI program on Topological and Geometric Structures in Low Dimensions (2026), Group actions and rigidity: around the Zimmer program (Inst. Henri Poincaré thematic semester, 2024), Fields institute thematic program in Set-Theoretic Methods in Algebra, Dynamics, and Geometry (2023), Canadian Mathematical Society 75th anniversary meeting (2021), Young Geometric Group Theory VI (2017), Groups acting on manifolds workshop (UFF Brazil, 2016).

III. Mathematical outreach

Co-organizer, Topology Students Workshop (professional development for grad students)	Summer 2018, 2020
Co-organizer of Topology Postdocs Workshop	July 2020
Faculty advisor for graduate-undergraduate mathematics Directed Reading Program (at Brown, then Cornell)	2017–
Canada/USA Mathcamp (high-school advancement program) *visiting speaker*	Summer 2015, 2018
Research Experience for Undergraduates (U. Chicago), *Mentor for 8 undergrads*	2009, 2011
University of Chicago Directed Reading Program *Supervised 7 independent study projects*	2010-2013
Graduate student coordinator for Summer REU at University of Chicago	Summer 2011

Undergraduate/general–audience talks at:
Cornell, University of Chicago, UC Berkeley, UC Santa Barbara, Sonoma State University, Harvard, University of Michigan, Brown, Swarthmore, Cambridge Mathematics Society

IV. Committees

Cornell math first year advising committee	2020–
Undergraduate math major committee	2022–
Cornell mathematics diversity committee and library committee	2020-21
Brown mathematics department diversity committee and colloquium committees	2017-19

V. Editorial work:

Member of editorial board of: Geometriae Dedicata (2020–), Communications of the American Mathematical Society (2021–), Journal of Topology (2022–).